Fire Extinguisher Safety

HS1670 - W

PDF Version

Course Objectives

After completing this course, you should be able to:

1. Identify the three elements of the “fire triangle” and how they relate to fire extinguishers.
2. Identify four classifications of fuels.
3. Identify four types of fire extinguishers and their fuel labels.
4. Know what to do in case of a fire.
5. Observe the fire safety rules.

Audio Narration:

Welcome to HS1670-W, Fire Extinguisher Safety. After completing this course, you will be able to:

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2. Identify four classifications of fuels.
3. Identify four types of fire extinguishers and their fuel labels.
4. Know what to do in case of a fire.
5. Observe the fire safety rules.

Course Outline

Module 1: The fire triangle

Module 2: Fuel Types

Module 3: Extinguisher Types and Their Labels

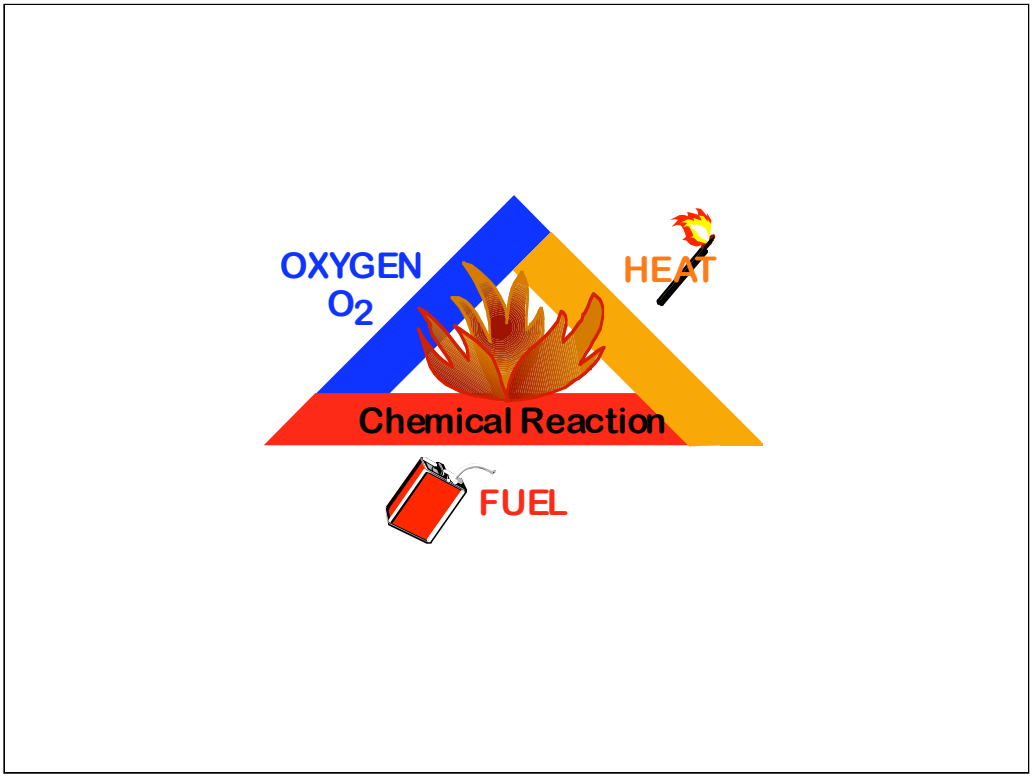
Module 4: What To Do in Case of a Fire

Module 5: Fire Safety Rules

Audio Narration:

The content of this course follows the course objectives. Module 1 will cover the “fire triangle” and how it relates to fire extinguishers. Module 2 explains the four classifications of fuels. Module 3 covers the different types of fire extinguishers and their labels. Module 4 explains what to do in case of a fire. And Module 5 covers some fire safety rules and requirements. Let’s get started.

Module 1: The Fire Triangle



Audio Narration:

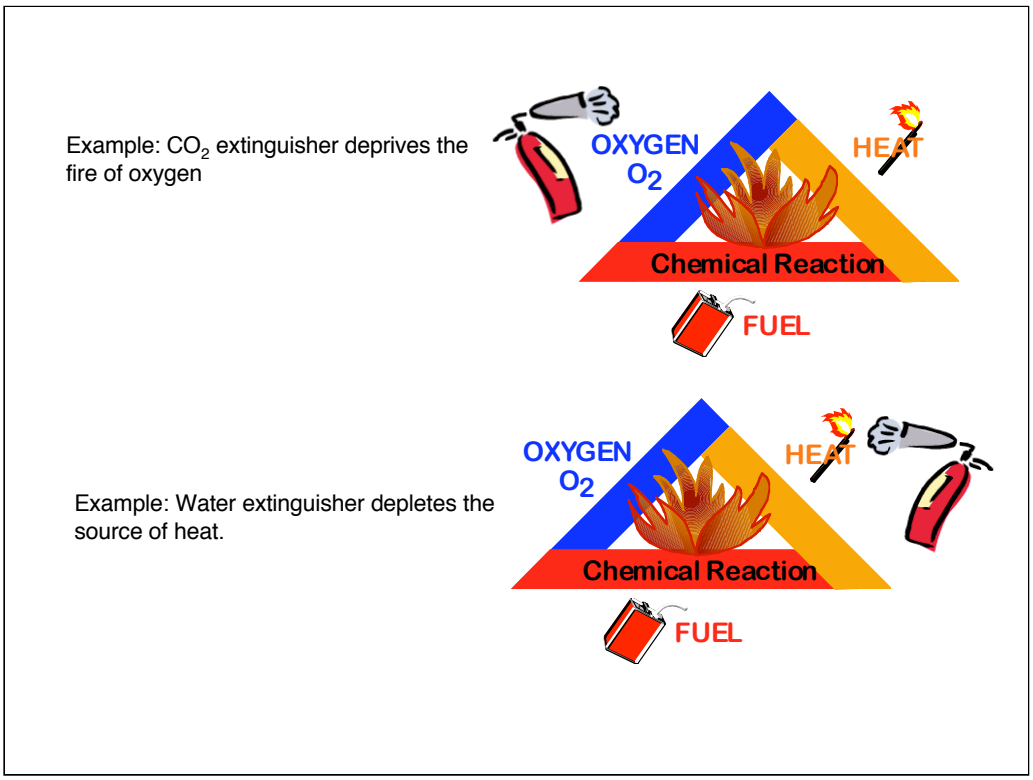
As the name implies, the “fire triangle” is made up of three components: oxygen, heat, and fuel. Fire needs all three components to “live.” To have fire, you must have:

-Enough oxygen to sustain combustion.

-Enough heat to ignite the material.

-Some sort of fuel or combustible material to burn.

-Plus, a chemical chain reaction among all three components.



Audio Narration:

Fire extinguishers put out a fire by targeting one or more of the fire triangle components.

For instance, a CO2 extinguisher deprives fire of oxygen; while a water extinguisher depletes the source of heat.

Fire safety is based on the principle of keeping fuel sources and ignition sources separate. Because, the best way to fight fires is to not allow them to start in the first place.

Module 2: Fuel Types

Fuel Types

Wood, paper, trash, plastic, solid combustible materials that are not metals.

Flammable liquids: gasoline, oil, grease, acetone, any non-metal in a liquid state.

Energized electrical equipment (computers, machinery, appliances, etc.)

Combustible metals (potassium, sodium, aluminum, magnesium, plutonium, etc.) May be found at NIF and the Superblock.

Flammable vegetable and animal oils/fats.

Audio Narration:

Knowing the various types of fuel is important - because using the wrong fire extinguisher on the wrong type of fire can make it much, much worse. There are five classifications of fuel, and no one extinguisher is capable of combating all five types.

Class A fuels include wood, paper, cloth, trash, plastic, and solid combustible materials that are not metals.

Class B fuels include flammable liquids such as gasoline, oil, grease, acetone, and any non-metal in a liquid state.

Class C fuels include energized electrical equipment - that is, electrical equipment that is “plugged in.”

Class D fuels include metals such as potassium, sodium, aluminum, magnesium and plutonium. It is unlikely you’ll have to deal with a Class D fire since such fuels are not widely found at LLNL. However, those who work in the National Ignition Facility (NIF) or in the Plutonium Facility (Superblock) may come in contact with Class D fuels. If that’s you, pay special attention. It takes special fire extinguishing agents (Met-L-X, foam) to fight this type of fire.

Class K fuels include combustible cooking media such as vegetable and animal oils and fats.

Module 3: Extinguisher Types and Their Labels

Fighting Class A Fires

- APWs are for Class A fires only
- Silver, two-thirds ordinary tap water, pressurized with air.

Air Pressure Water Extinguisher (APW)

Audio Narration:

As mentioned earlier, when combating a fire you want to be sure to use the right type of extinguisher to put the fire out as quickly as possible without spreading the fire.

Air Pressure Water Extinguishers (APWs) are used to combat Class A fires such as a paper fire. Water deprives the fire of heat. These extinguishers are silver and two-thirds ordinary tap water then pressurized with normal air.

An APW is like a giant squirt gun.

NEVER use water to extinguish:

- Flammable liquid fires.
- Electrical fires.

DO NOT USE

Audio Narration:

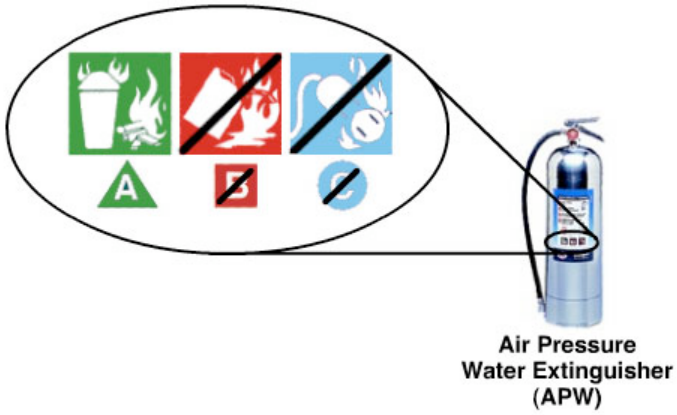
Never use APWs with

-Flammable liquid fires

-Electrical fires

Using water on such fires can cause violent reactions and spread the fire.

Air Pressure Water Extinguishers are only for Class A fires.



Air Pressure
Water Extinguisher
(APW)

Audio Narration:

APWs are only used for Class A fires. An APW may have a label similar to this one, indicating it should only be used on Class A fuels.

Carbon Dioxide (CO_2) Extinguisher for Class B and C (BC) fires

- Non-flammable carbon dioxide gas under extreme pressure
- Red in color
- Hard nozzle; no pressure gauge
- Caution: emits very cold material

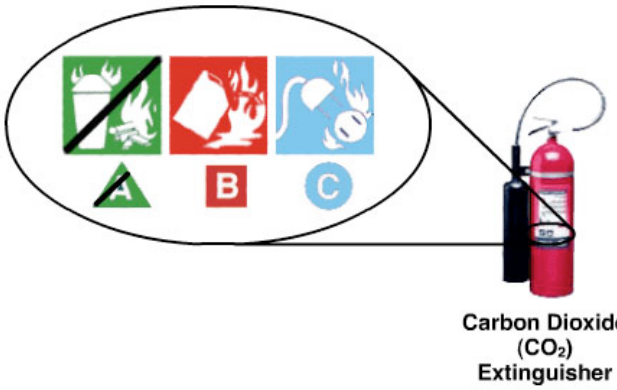
Audio Narration:

Carbon dioxide (CO_2) extinguishers are used for Class B and C fires.

These extinguishers are filled with non-flammable carbon dioxide gas under extreme pressure. A CO_2 extinguisher is red and can be recognized by its hard nozzle and lack of a pressure gauge. Note that carbon dioxide gas under this much pressure is very cold when exerted and bits of dry ice may shoot out the horn.

CO_2 extinguishers are found in areas such as labs, mechanical rooms, kitchens, and flammable liquid storage areas.

Carbon Dioxide (CO_2) Extinguisher for Class BC



Audio Narration:

CO_2 extinguishers displace oxygen, cool the fuel and may be ineffective on Class A fires. This kind of label would be on a Class B and C extinguisher.

Dry Chemical Extinguishers for Class BC/ABC fires

• Combat fire by separating the fuel from the oxygen in the air.

Dry Chemical Extinguisher

Audio Narration:

Dry Chemical Extinguishers combat fire by coating the fuel with a thin layer of dust that interrupts the chemical reaction of fire by separating the fuel from the oxygen in the air. For example, some are filled with a yellow powder (monoammonium phosphate) and pressurized with nitrogen.

They can be used on Class B and C OR Class A, B, and C depending on how they are labeled. ABC extinguishers will have this label. BC extinguishers are labeled exactly that - BC- and will have a pictograph such as this.

Read the labels on the fire extinguishers in your area. You wouldn't want to mistakenly use a BC extinguisher on a Class A fire thinking it was an ABC extinguisher.

Dry Chemical Extinguishers for Class BC/ABC fires

- Red in color

Found in:

- public hallways
- laboratories
- mechanical rooms
- break rooms
- chemical storage areas
- offices

Audio Narration:

Dry chemical extinguishers are red and are found in new buildings, located in public hallways. They may also be found in:

•laboratories

-mechanical rooms

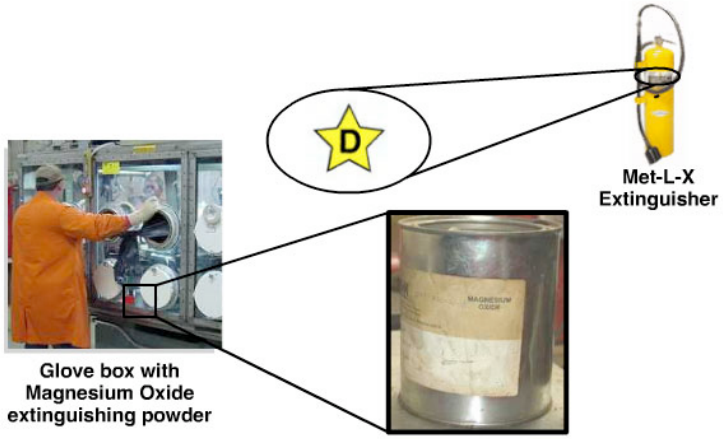
-break rooms

-chemical storage areas

-offices, etc.

DC extinguishers designed for only Class B and C fires are normally found in areas with flammable liquids.

Specialty Extinguishers for Class D fires



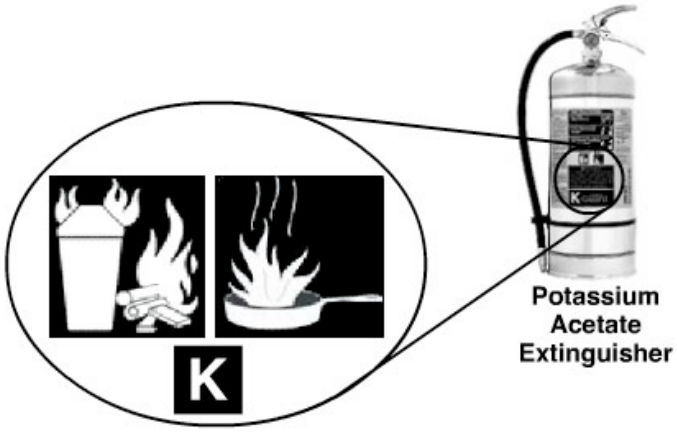
Audio Narration:

Class D fires require specialty extinguishers to deal with flammable metals. Some of these metals are pyrophoric, meaning they can ignite spontaneously under special circumstances. Class D extinguishers are yellow and have this type of label. The dry powder doesn't react with the fire, it works by smothering the fuel and fire.

In certain circumstances, an extinguisher may not be available for a Class D fire and you may need to use the dry powder alone. Here at LLNL, for instance, we have small containers of extinguishing agent in some glove boxes. Simply remove the cap and poor the contents on the fire. Class D fires are very hot, so don't be modest with the extinguishing agent. Make sure the fuel is completely covered.

Fighting Class K Fires

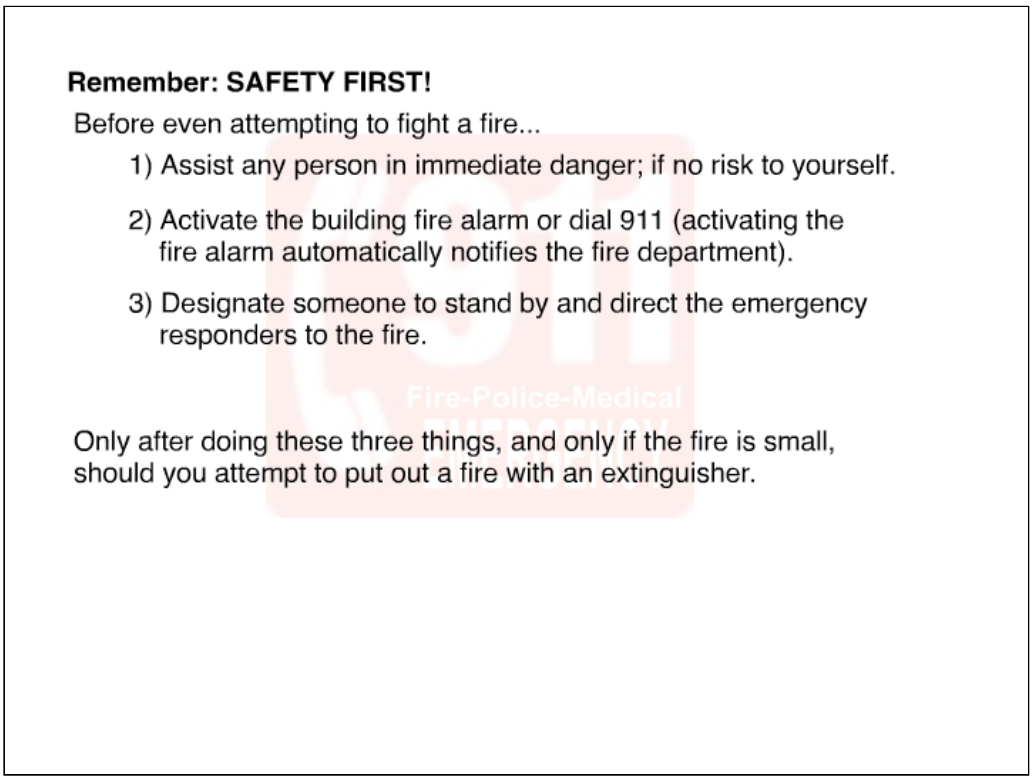
- Typically stainless steel
- For flammable cooking media
- NOTICE: look very similar to Class A extinguishers



Audio Narration:

Finally, Class K extinguishers are typically stainless steel and contain a liquid agent specifically designed for use on fires that involve flammable cooking oils or animal fats in commercial cooking equipment such as fryers, griddles or range tops. They look similar to Class A extinguishers so be sure to check the label before fighting a fire. Class K extinguishers are marked with this label.

Module 4: What To Do in Case of a Fire



Audio Narration:

Never endanger yourself or others when attempting to put out a fire. Before you even attempt to fight a fire using a portable extinguisher you should take the following steps when the fire is discovered.

First and most importantly, assist any person in immediate danger - if there is no risk to yourself.

Second, activate the building fire alarm or notify the fire department by dialing 911. Activating the fire alarm automatically notifies the fire department.

Third, designate someone to stand by and direct the emergency responders to the fire.

Only after doing these three things, and only if the fire is small, should you attempt to put out the fire with an extinguisher.

Remember: Safety First!

Pull the pin

Aim at the base

Squeeze the lever

Sweep from side to side

Audio Narration:

Okay, so how do you use a fire extinguisher correctly? It's easy. Just think "PASS" - as in "PASS" me the fire extinguisher. The acronym stands for: Pull, Aim, Squeeze, and Sweep.

First, pull the safety pin. Second, aim at the base of the fire. Third, squeeze the trigger or lever. And finally, sweep the spray from side to side until the fire is out.

Always start a safe distance away and move toward the fire as you extinguish.

After the fire is out:

- Keep a close eye.
- For Class A fires, break up debris and continue to extinguish embers.
- Have the extinguisher recharged IMMEDIATELY.

Audio Narration:

Once the fire is out, keep a close eye on it to be sure it doesn't reignite.

For Class A fires, once the flames are out, break apart the debris and continue to discharge the extinguisher contents onto the debris. Embers may continue to burn and re-ignite.

Note: After using a fire extinguisher it will need to be recharged. Have it recharged IMMEDIATELY so it is ready for use again.

Module 5: Fire Safety Rules and Requirements

OSHA Requirements

- A means for proper exit or escape from the building.
- Appropriate fire extinguisher for the workplace
- An emergency plan in place
- Proper training for employees

Audio Narration:

The Occupational Safety and Health Administration (OSHA) requires several things to be in place in order to keep employees safe in case of a fire.

You must have:

•A means for proper exit or escape from a building.

•Appropriate firefighter equipment in place such as fire extinguishers that are easily seen and properly marked with a sign or red zone marker.

•And an emergency plan in place.

Also, employees are required to be properly trained.

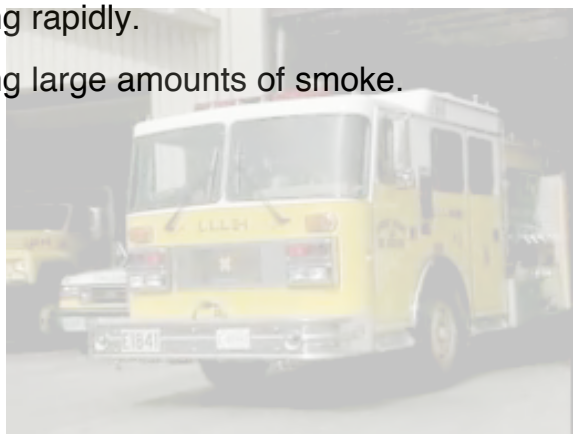
Fire Safety Rules

DO NOT fight a fire:

• If you don't know what is burning or what type of extinguisher to use.

• If the fire is spreading rapidly.

• If the fire is producing large amounts of smoke.



Audio Narration:

Here are a few fire safety rules to remember.

Don't fight a fire if:

-You don't know what is burning or what type of extinguisher to use. Remember, there is no one fire extinguisher for every fire.

-The fire is spreading rapidly beyond the starting point.

-The fire is producing large amounts of smoke that you would have to breathe in order to fight it.

In these circumstances, it is better to get to safety and let the fire department do its job.

If you have any questions or concerns about the fire extinguishers in your area, please contact your ES&H Team.